VORTISAND®

CASE HISTORY

Johnson Matthey Improves Process water cooling system efficiency at West Deptford, NJ

Johnson Matthey is a world leader in advanced material technology with main activities focusing on catalysts, fine chemicals and precious metals manufacturing and refining. Many of Johnson Matthey's products have a beneficial impact on the environment (autocatalysts). The company has operations in 38 countries and employs about 6,500 people. The company requires that each of their locations around the world formulate its own detailed performance targets to meet the key objectives set out in the Corporate Environmental Policy.

Built in 1983, Johnson Matthey plant located in West Deptford, NJ, has a 12 million square feet surface. The facility has 200 employees and specializes in the refining of precious metals (gold) from mining operations and secondary (scrap) material.

The manufacturing operations require continuous cooling. The process cooling water is used for cooling the water jackets on the large mixers used in the recovery phase. The facility operates 24 hours a day and seven days a week.

The existing 1,500 ton cooling system consists of 4 Marley cooling towers on ground level. The 40,000 gallon system volume operates with a 100 % load factor, 4,500 gpm recirculation flow and 3 cycles of concentration.

Problems: The cooling towers are installed on the ground level in an area where there is much truck traffic. This caused dirt to enter the cooling towers on a regular basis in conjunction with normal airborne particulate that was routinely found in tower systems.

Mr. Rick Dickinson, Project Engineer, first contacted Sonitec Inc. pertaining this process cooling water problem. We noticed on our first visit (1998) that the cooling water was extremely dirty. It was said to be a normal operating condition and occasionally the water quality was even worse.

This corrosive environment caused the cooling jackets to breakthrough the mixer wall lining resulting in an even more severe contamination problem for the tower process water loop. Particulate contaminants were eroding the cooling jackets, thus wearing down the cooling jacket and causing breakthroughs.

Solution: Sonitec Inc. first supplied the smallest Vortisand® pilot filter (model AWT1-12 at 2.0 micron filtration) for a three week period to evaluate the influent VS effluent water quality. Spectrex particle distribution analysis were done and the results were better than ever expected. The pilot unit had cleaned the cooling water loop well enough so that the client could see the bottom of the tower sump basin.

C A S E H I S T O R Y

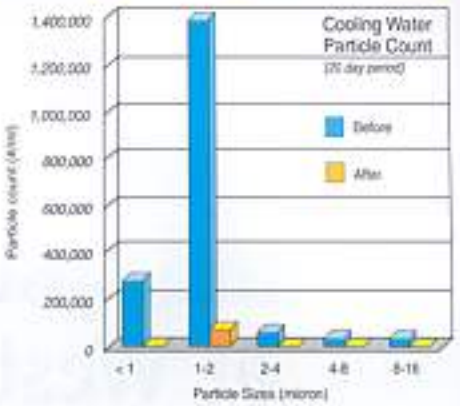
Further water testing showed that the suspended solids levels were still high in the lower to sub-micron size range.

In July 1999, a permanent Vortisand® filter model AWT2-20-SI was purchased and installed. It has produced the cleanest cooling water this facility has ever had – quite like drinking water. The Vortisand® filtration system was manufactured with larger piping and pump which allow future expansion of the process cooling water system by simply adding on one or more filter vessels.

Cost Savings: Johnson Matthey estimated the Return On Investment to be **20,000$ per year savings** which would represent **a payback period of 10-12 months**. The major cost savings will come from the reactor vessels extended life and the maintenance cost reduction.

Both Johnson Matthey and Betz-Dearborn, the chemical supplier, were impressed with the results and have realized the benefits of installing Vortisand® filters to optimize the existing cooling system. Both can get back to business better than before !

Particle Size	Before 07/16/99 (#/ml)	After 08/06/99 (#/ml)	Removal Efficiency (%)
< 1 µm	284,580	0	100%
1-2 µm	1 396 831	81,128	94%
2-4 µm	71,688	8,502	88%
4-8 µm	45,620	1,642	96%
8-16 µm	43,446	410	99%



Results show that the water quality has been greatly improved with 100% removal efficiency for particles smaller than 1 micron.

SPECIFICATIONS
Model AWT2-30-SI

- ***Filtration flow*** : 170 gpm
- ***Media Sizing:*** 0.45 micron
- ***Number of vessels*** : 2
- ***Vessel diameter*** : 30 "
- ***Vessel:*** stainless steel 304 (100 psi, ASME Sec. VIII, Div.1)
- ***Face piping:*** Carbon steel Sch. 40
- ***Pump:*** Centrifugal with 5 HP ODP motor
- ***Control Panel:*** Nema 12 enclosure with PLC including differential pressure switch, stager valve, backwash counter, main disconnect switch and pump motor starter.
- ***Maximum operating pressure:*** 100 psi
- ***Maximum operating temperature:*** 105°F
- ***Space required:*** 8'6"L x 5'0" x 3'10 "

This project was being lead by Keith Karl, Regional Sales Manager of Sonitec Inc. For further information regarding this and other projects, please contact us.

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